Algorithmic aspects of high-performance computing for mechanics and physics

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The development of more powerfull and energy efficient computer architectures is widening the use of large scale -high performance- computing techniques. Important increases in computational power are being achieved by many core systems with powerfull accelerators such as general purpose graphics processing units (GP-GPUs). These systems also include more complex hierarchical cache/memory designs which permit to provide the needed data flow required by computing units. These new hardware designs poses a challenge for the implementation and scalability of current simluation algorithms and, at the same time, offers the an oportunity for the development of new ones.

In this framework the proposed minisymposium aims to discuss algorithmic aspects of large scale computing. The topics include new developments in domain decomposition, multigrid and sparse direct methods, in terms of theoretical aspects, practical implementation and scalability studies. Tailored algorithms for multiphysics problems, e.g. fluid-structure interaction, porous media flows or MHD, are also welcomed.